Electorate calculation processes

Introduction

1. This document explains the processes we have used during our Sixth Review of UK Parliament Constituencies when calculating the electorate of each of our proposed constituencies.

2. In these processes we use data provided to us by National Records of Scotland (NRS).

3. The definition of electorate for this review is in the Parliamentary Constituencies Act 1986, and is the parliamentary electorate on the electoral register published on 1 December 2010, including attainers. Attainers are those who appear on the register and who became 18 years of age during the year following 1 December 2010.

4. The electorate of each proposed constituency in this review has to be no less than 72,810 and no more than 80,473 (the *statutory electorate limits*), unless one of the specified exemptions from the *statutory electorate limits* apply.

5. Each of Scotland's 15 Electoral Registration Officers provided us with a copy of the electoral register for 1 December 2010 for their area. The electoral register contains an entry for each elector, which includes an indication of the ward which that elector is situated in.

6. NRS provides us with the parliamentary electorate for each council area (*council area electorate*) as reported to them by each Electoral Registration Officer.

7. We calculate the parliamentary electorate for each electoral ward (*ward electorate*) from the electoral register.

8. If the total of the *ward electorates* for a council area differs from the *council area electorate* published by NRS, we add or subtract 1 from each of the largest *ward electorates* so that the total of the *ward electorates* for a council area equals the *council area electorate*.

Postcodes

9. The postcode boundaries which we used are those supplied by NRS in September 2010.

10. Most postcodes refer to a number of individual addresses and are called *small user postcodes*. NRS creates a polygon defining the extent of each *small user postcode*. Where a *small user postcode* crosses a council area boundary, NRS divides the postcode into 2 parts, each of which is within a single council area.

11. The remaining postcodes refer to a single address which receives a large volume of mail and are called *large user postcodes*. For these, NRS links the *large user postcode* to the *small user postcode* which contains the location of the *large user postcode*. *Large user postcodes* can include university halls of residence and other residential establishments, as well as business organisations.

Constituency electorate

12. We determine the electorate of each proposed constituency in 4 stages. Each stage is explained in more detail later in this document.

> Stage I.   We calculate the number of electors in each postcode (*postcode electorate*) for each mainland council area;

> Stage II. We calculate the number of electors in each proposed constituency (*initial constituency electorate*) by summing the *ward electorates* and the electorate

in any *part-wards* that are located within the constituency. We calculate *part-ward* electorates using *postcode electorates*.

Stage III. If a proposed constituency contains one or more *part-wards*, we carry out further analysis to ensure that the *statutory electoral limits* are not breached by determining the *refined constituency electorate*.

Stage IV. We accept the *initial constituency electorate* or *refined constituency electorate* as the *constituency electorate*.

Stage I – calculate postcode electorates

13. The process we use to calculate the *postcode electorates* for each council area is illustrated at Figure 1, and comprises the following steps:

Step 1. We add the correct postcode to any entry in the electoral register without a postcode.

Step 2. We count the electorate in the electoral register for each postcode.

Step 3. Where the postcode appears in the NRS dataset as a *small user postcode*, we record that electorate count against that postcode.

Step 4. Where the postcode appears in the NRS dataset as a *large user postcode*, we add its electorate to the electorate count of the corresponding *small user postcode*.

Step 5. If the postcode in the electoral register does not appear in the NRS dataset, we refer to other sources, such as the website of the council for the area, to identify the location of that postcode, and thus identify the corresponding *small user postcode*. Having done so, we add its electorate to the electorate count of the corresponding *small user postcode*.

Step 6. If the total of the *postcode electorates* for a council area differs from the *council area electorate*, we add or subtract 1 from each of the largest *postcode electorates* so that the total of the *postcode electorates* for a council area equals the *council area electorate*.
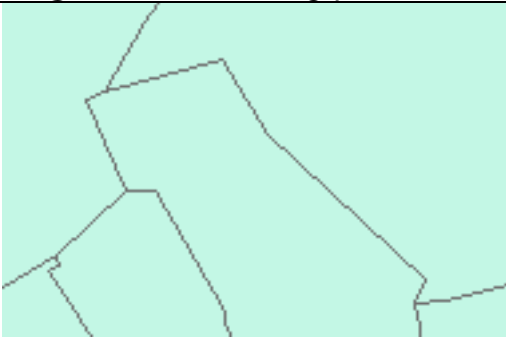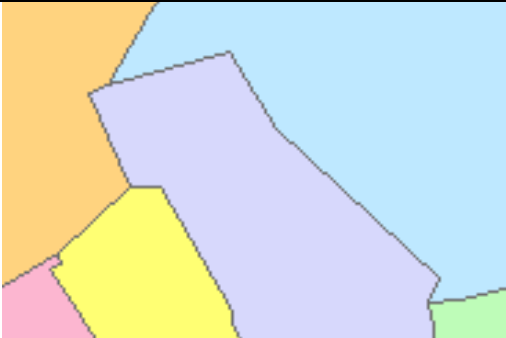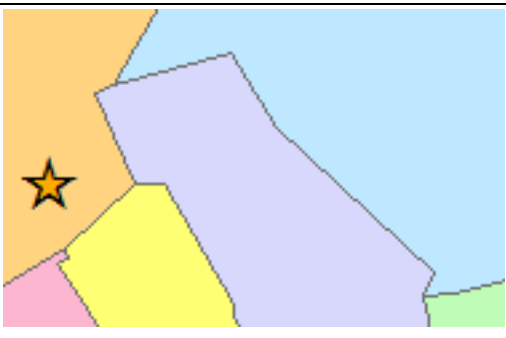
14. On completion of these steps we have a dataset of *postcode electorates* for each postcode in the NRS dataset in a council area. We published the resulting postcode electorate dataset on our website for the review (http://www.bcomm-scotland.independent.gov.uk/6th_westminster/electoratedata/).

Stage II – calculate initial constituency electorate

15. The process we use to calculate the electorate of a proposed constituency comprises the following steps:

Step 1. We identify all the wards that are wholly contained in the proposed constituency and the corresponding *ward electorates*;

Step 2. We identify all the wards which are partly within a proposed constituency (*part-wards*).

Step 3. For each *part-ward*, we calculate the *initial part-ward electorate* as the sum of the *postcode electorates* whose centroids are contained in the *part-ward*.

Step 4. The *initial constituency electorate* is the total of the *ward electorates* and the *initial part-ward electorates*.

Figure 1: *calculating postcode electorates*

Step 2: Count electors		Postcode	electors
		PA34 1PX	3
		PA34 5AD	6
		PA34 5AQ	30
		PA34 5AR	24
		PA34 5AS	39
		PA34 5AT	103
		PA34 5AU	0
		PA34 5TX	24

Step 3: Match *small user postcodes*		Postcode	electors
		PA34 1PX	3
		PA34 5AD	6
		PA34 5AQ	30
		PA34 5AR	24
		PA34 5AS	39
		PA34 5AT	103
		PA34 5AU	0
		PA34 5TX	24

Step 4: Link *large user postcodes* to *small user postcodes*		Postcode	electors
		PA34 1PX	3
		PA34 5AD	6 ⭐ 0
		PA34 5AQ	30 ⭐ 36
		PA34 5AR	24
		PA34 5AS	39
		PA34 5AT	103
		PA34 5AU	0
		PA34 5TX	24

Step 5: Match unmapped postcodes		Postcode	electors
		PA34 1PX	3 ⭐ 0
		PA34 5AD	0
		PA34 5AQ	36
		PA34 5AR	24
		PA34 5AS	39
		PA34 5AT	103
		PA34 5AU	0
		PA34 5TX	24 ⭐ 27

		Postcode	electors
		PA34 1PX	0
		PA34 5AD	0
		PA34 5AQ	36
		PA34 5AR	24
		PA34 5AS	39
		PA34 5AT	103
		PA34 5AU	0
		PA34 5TX	27

Stage III - confirm constituency electorate is within statutory electorate limits
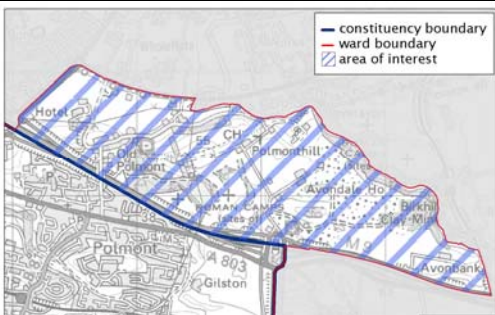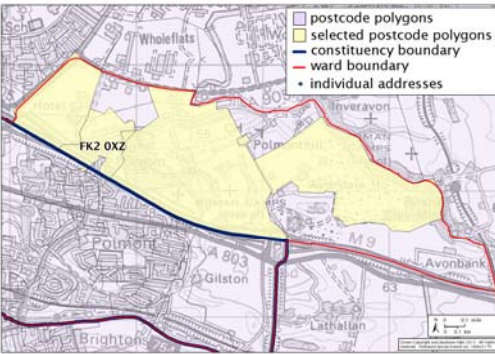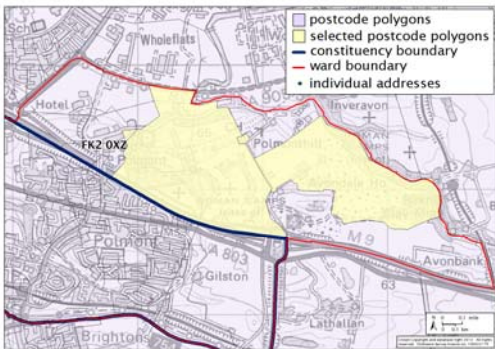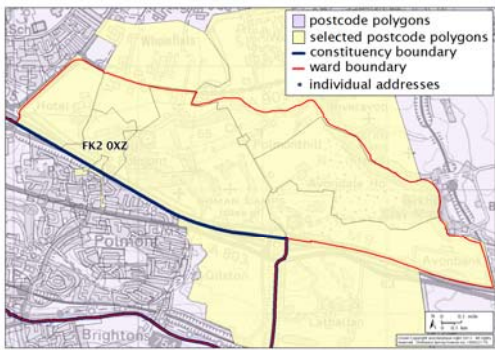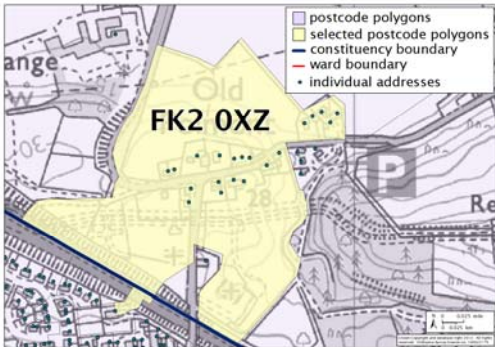
16. Where a proposed constituency contains one or more *part-wards*, we take the following steps for each *part-ward* to ensure that the *constituency electorate* is within the *statutory electorate limits.* The steps are illustrated in Figure 2.

   Step 1.   The *initial part-ward electorate* is the total of the *postcode electorates* for the postcodes which have their centroid in the *part-ward*.

   Step 2.   We calculate the *minimum part-ward electorate* as the total of the *postcode electorates* which are completely within the *part-ward*.

   Step 3.   We calculate the *maximum part-ward electorate* as the total of the postcode electorates which are wholly or partly within the *part-ward*.

   Step 4.   We calculate the *minimum constituency electorate* as the total of *ward electorates* for wards wholly contained in the constituency and the *minimum part-ward electorates*.

   Step 5.   We calculate the *maximum constituency electorate* as the total of *ward electorates* for wards wholly contained in the constituency and the *maximum part-ward electorates*.

   Step 6.   If the *minimum constituency electorate* is below the minimum *statutory electorate limit* or the *maximum constituency electorate* is above the maximum *statutory electorate limit*, we examine postcodes which crossed the boundary of the *part-ward*. We start with the postcode with the largest *postcode electorate*. For these postcodes, we study the location of individual addresses, and the number of electors at these addresses, in order to refine the *minimum constituency electorate* and the *maximum constituency electorate*.

   Step 7.   We continue step 6 until we can determine that the refined *minimum constituency electorate* and *maximum constituency electorate* are within the *statutory electorate limits*.

Stage IV - accept constituency electorates

17. If Stage III shows that the *constituency electorate* may be outside the *statutory electorate limits*, we amend the constituency design and repeat the process. Otherwise, we accept the *initial constituency electorate* or *refined constituency electorate* as the *constituency electorate*.

18. For a group of constituencies covering a set of council areas, we calculate the *minimum constituency electorate* and the *maximum constituency electorate* for the last constituency checked by subtracting the maxima and minima for the other constituencies from the council area totals.

19. We publish the accepted *constituency electorates* for the proposed constituencies on our website for the review (http://www.bcomm-scotland.independent.gov.uk/6th_westminster/).

Figure 2: *calculating maximum and minimum part-ward electorates*

Ward to be divided between two constituencies		
Step 1: Calculate *initial part-ward electorate*		Postcode electorate FK2 0XH 10 FK2 0XZ 45 FK2 0YD 10 FK2 0YF 2 Total 67
Step 2: Calculate *minimum part-ward electorate*		Postcode electorate FK2 0XH 10 FK2 0YD 10 FK2 0YF 2 Minimum 22
Step 3: Calculate *maximum part-ward electorate*		Postcode electorate FK2 0QS 15 FK2 0XH 10 FK2 0XZ 45 FK2 0YD 10 FK2 0YE 11 FK2 0YF 2 FK2 0YG 6 FK3 9UY 0 Maximum 99
Step 6: Refine maximum and minimum by examining individual addresses within postcode		Postcode electorate FK2 0XZ 45 within part-ward 37 outwith part-ward 8 Refined minimum 22 + 37 = 59 Refined maximum 99 - 8 = 91